THE CLAIMS

WE CLAIM:

1. A method for coating at least a portion of a medical device, wherein the portion has a surface adapted for exposure to body tissue of a patient, the method comprising:

(a) grounding the surface; and

(b) applying to the surface a coating formulation comprising a polymeric material and a solvent, said step of applying comprising the steps of

(1) providing a nozzle apparatus comprising a chamber connected to at least one opening for dispensing the coating formulation;

(2) placing the coating formulation into the chamber;

(3) electrically charging the coating formulation;

(4) creating droplets of the electrically charged coating formulation; and

(5) depositing the droplets of coating formulation onto the grounded surface to form a coating on the surface.

2. The method of claim 1 wherein the nozzle apparatus further comprises a conductor that connects the chamber to a voltage power source.

3. The method of claim 2 in which the conductor is an electrode and the coating formulation is electrically charged by flowing the coating formulation across the electrode.

4. The method of claim 1, wherein step (b) is repeated at least one time.

5. The method of claim 4, wherein step (b) is repeated using a second coating formulation.

6. The method of claim 1, wherein the coating formulation further comprises a biologically active material.

7. The method of claim 1, wherein the droplets of coating formulation are deposited at a flow rate of about 0.02 ml/min to about 0.1 ml/min.

8. The method of claim 1, wherein the coating formulation has a volumetric resistivity of from about 10^7 ohm-cm to about 10^{10} ohm-cm.

9. The method of claim 1, wherein the coating formulation has a viscosity of from about 1 cps to about 20,000 cps.

10. The method of claim 1, wherein the coating formulation is electrically charged by a voltage power source having a voltage of about 8kV to about 12 kV and a current of about microamp 5 to about 40 microamp.

11. The method of claim 1, wherein the solvent is selected from a group consisting of tetrahydrofuran, chloroform, toluene, acetone, isooctane, 1,1,1-trichloroethane and mixtures thereof.

12. The method of claim 1, wherein the polymeric material is selected from the group consisting of styrene-isobutylene-styrene, polyurethanes, silicones, polyesters, polyolefins, polyisobutylene, ethylene-alphaolefin copolymers, acrylic polymers and copolymers, vinyl halide polymers, polyvinyl ethers, polyvinylidene halides, polyacrylonitrile, polyvinyl ketones, polyvinyl aromatics, polyvinyl esters, copolymers of vinyl monomers, copolymers of vinyl monomers and olefins, polyamides, alkyd resins, polycarbonates, polyoxymethylenes, polyimides, polyethers, epoxy resins, polyurethanes, rayon-triacetate, cellulose, cellulose acetate, cellulose butyrate, cellulose acetate butyrate, cellophane, cellulose nitrate, cellulose propionate, cellulose ethers, carboxymethyl cellulose, collagens, chitins, polylactic acid, polyglycolic acid, polylactic acid-polyethylene oxide copolymers, EPDM rubbers, fluorosilicones, polyethylene glycol, polysaccharides, phospholipids, and combinations of the foregoing.

13. The method of claim 12, wherein the polymeric material is styrene-isobutylene-styrene.

14. The method of claim 1, wherein the coating formulation comprises styrene-isobutylene-styrene and chloroform.

15. The method of claim 1, wherein the polymeric material is about 1 to about 15 weight % of the coating formulation.

16. The method of claim 6, wherein the polymeric material has a melting point that is lower than the decomposition temperature of the biologically active material.

17. A medical device coated according to the method of claim 1.

18. A method for coating at least a portion of a medical device, wherein the portion has a surface adapted for exposure to body tissue of a patient, the method comprising:

(a) grounding the surface; and

(b) applying to the surface a coating formulation comprising a polymeric material, a biologically active material and a solvent, said step of applying comprising the steps of

(1) providing a nozzle apparatus comprising an electrode and a chamber connected to at least one opening for dispensing the coating formulation;

(2) placing the coating formulation into the chamber;

(3) electrically charging the coating formulation by flowing the coating formulation across the electrode;

(4) creating droplets of the electrically charged coating formulation; and

(5) depositing the droplets of coating formulation onto the grounded surface to form a coating on the surface.

19. A method for coating a surface of an implantable stent, the method comprising:

(a) grounding the surface; and

(b) applying a coating formulation, which comprises a polymeric material, a biologically active material and a solvent to the surface using a nozzle apparatus by:

(1) providing the nozzle apparatus comprising a chamber connected to at least one opening for dispensing the coating formulation;

(2) placing the coating formulation into the chamber;

(3) electrically charging the coating formulation;

(4) creating droplets of the electrically charged coating formulation; and

(5) depositing the droplets of coating formulation onto the grounded surface to form a coating on the surface.